# Joint Case Study: Conserving Energy through water management.

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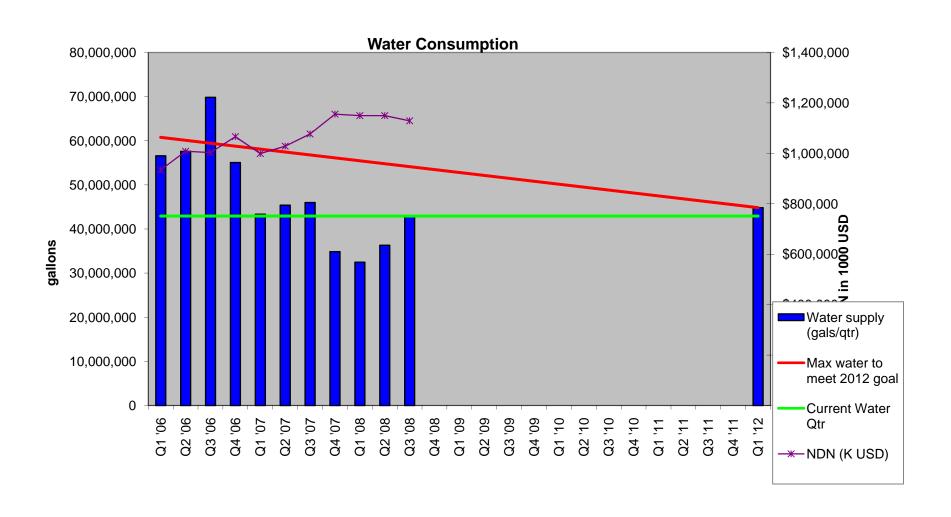
3 December 2008



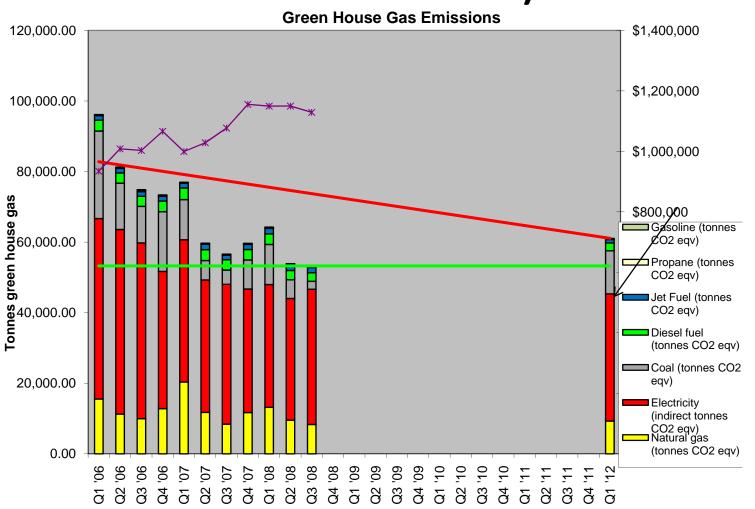
Environmental
Footprint Reduction
Goal for
Steelcase....

By our 100<sup>th</sup> anniversary (2012) we are committed to reducing water and energy use (among many other environmental metrics) by at least 25%.

### Water Reduction Progress at Steelcase



# Energy Reduction Progress at Steelcase (shown as GHG reduction)



- Water savings just one factor in Energy savings equation.
- Total Cost of Ownership encompasses process as a whole to take advantage of synergies.
- Other factors contributing to energy savings are
  - fewer chemical stages
  - chemicals with lower design operating temps
  - counter flow system raising temperature through out
  - lower overall temperature reducing water loss due to evaporation

### Items that Reduce Water Consumption

less evaporation

elimination of inputs/outputs

100% re-use of water in any number of stages

make up of chemical stages with water from following stage

## Items that Reduce Energy Consumption

Lowering of "delta T" by reducing heat required in chemical stages.

Pre wash (where able to use) raising temperature of process parts with otherwise "cast off" heat.

Raising of "delta T" by using carry over heated fluid from chemical stages for there make up instead of cold water supply.

Reducing min/max temperature differential in system through water reuse of water from one input (last stage in system).

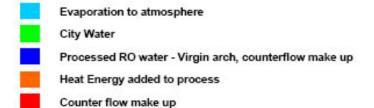


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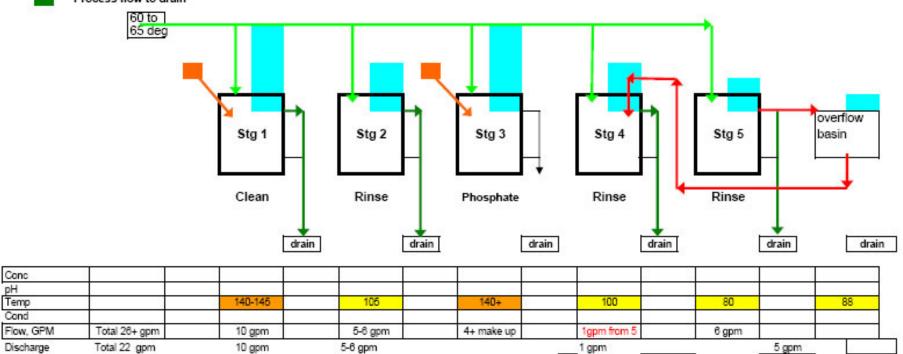
#### Steelcase - Atlanta Plant - STD, washer



Pretreatment Washer - Current State as of: 06-11-07



Process flow to drain

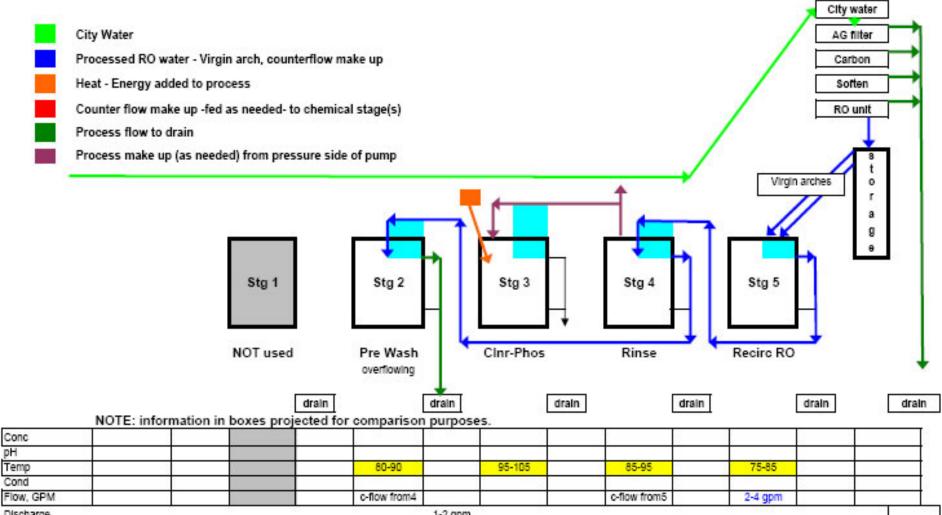




#### Steelcase - Atlanta Plant - Standard washer



#### Pretreatment Washer - Start up plan



# **Cost Reduction Summary**





#### Steelcase Inc. Atlanta GA

Projected "TCO" Summary - Ped Line Washer - Updated 12-31-07

<u>Metric</u>	<u>KPI</u>	Time Frame	Basis for Reduction	Percent Reduction	\$'s per <u>Unit</u>		Financial Impact
ENERGY	BTU's	annual	Stg 3 temp reduction 140 to 110 Stg 1 turn burner off	-50% -100%	\$1.18 / CCF *	\$	(173,082.52)
LABOR	menu items (cost & frequency)	annual	impact of RO water on process eliminating "hard" scale & sludge	-68%	per "event" **	s	(14,978.60)
WATER / SEWAGE	Gallons, US	annual	100% use & reuse of "purified" water (via counter flow) current at approx. 6,000,000 gal/yr	-88%	\$3.00 / CCF ***	\$	(21,176.32)
PROCESS CHEMICALS	Gallons, US	annual	fewer chemical charge-ups lower chemical concentrations fewer chemical stages	-10%	\$3.00 to \$5.00 per Gal., premium	\$	(5,000.00)

"TCO" (Total Cost of Ownership) impact on Steelcase	\$ (214,237.44)
"TCO" (Total Cost of Ownership) impact on a Steelcase "production hour"	\$ (107.12)

# Technical Challenges to Overcome

- Lower overall temps...lower flows... neutral pHs...
   leaves potential for more bio growth issues.
- Counter flow system advantage of reuse also leaves all waters going to all stages so issues like bio will end up everywhere... these issues are very manageable but do require attention and an action plan.

## In conclusion...

The enormous benefits of a total cost of ownership focus far outweigh the obstacles to overcome, including personal, professional, and the technical issues previously mentioned.

# thank you.